

Work Order ID 52217

Monday, September 21, 2009 7:52:04 AM



Page 1

Item ID: D212-664-201

Revision ID: C



Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00


Required Date: 10/9/2009 Req'd Qty: 1.00


Reference:


Approvals: Process Plan: PL/WH Date: 09-9-21 Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Setup Start 
Stop 
Run Start 
Stop 

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D212-664-241	Rev C								

100
 DOCUMENT CONTROL
DC
Document Control
Memo
Photocopy bluefile and create labels as per PPP D212-664-201 CHG003

110
 Pick Kit
Packaging
Packaging
Memo

120
 BENDING MACHINE - CROSSTUBES
CNC Bend 2
CNC Alpha 160 Bender
Memo
Bend tube as per Dwg D212-664-241 using CNC bender program 212-af and Folio FT007

Scrap

(IV) 2 MB 09-10-20

Work Order ID 52217

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Page 2

Item ID: D212-664-201

Accept



Setup Start



Revision ID: C

Stop



Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/9/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

⇒ 8 09/10/20



140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

4-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241



MB 09-10-21

P10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-201 PAR #: N/A Fault Category: Cross-tube NCR: Yes No DQA: 1A Date: 09.12.08
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: / Date: 08.12.11

NCR: <u>52217</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
09.12.02 140		Tube dented @ saddle hole on cuff. Tube accidentally slipped & rotated in the employee's hands when being moved off the of the polishing stands.	↑	NO NICKS/DENTS ARE PERMITTED ON TUBE PER ICA, CP WAS CALCULATED NICK DEPTH ≈ 0.025 . SCRAP TUBE 09.12.03	✓	↑	↑	↑
		to the x-tube buggy. The cuff struck the handle of the bolt to adjust the stand height. R.C. Process & Not a lack of attention by the employee or carelessness.	09/12/08 05/01/12	-> give to Russ/Dan for testing	09/12/07	5 02/02/08	09/12/08 251042	02/02/09

NOTE: Date & initial all entries

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Item ID: D212-664-201

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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Accept



Setup Start



Stop



Cust Item ID:

Customer:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan/ Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 HandFXtube	Crosstubes Chemical Conversion	0.00							
Hand Finishing Crosstubes	Memo Chemical Conversion Coat as within 24 hours of bending and drilling	0.00							
160 QC	QC3- Inspect Part Finish	0.00							
Quality Control	Memo	0.00							
170 QC	QC5- Inspect part completeness to step on W/O	0.00							
Quality Control	Memo	0.00							

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Item ID: D212-664-201

Accept



Setup Start



Revision ID: C

Stop



Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/9/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan/ Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038 Issue P/O: _____ LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Packaging								
Packaging	Memo	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D212-664-241								

Work Order ID 52217

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Item ID: D212-664-201

Accept



Setup Start



Revision ID: C

Stop



Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/9/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210  SprayPaint	Spray Painting per QSI005 4.2 SprayPaint Memo 1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: _____ Finish Time: _____ PAINT: Start Time: _____ Finish Time: _____	0.00 0.00							
220  QC	QC14- Inspect Spray Paint Memo Then, Wrap in plastic bag to protect from scratches	0.00 0.00							

[illegible]

Monday, September 21, 2009 7:52:04 AM

A barcode consisting of vertical black bars of varying widths on a white background.

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

SECRET



Abstract

[illegible]

Accept Qty	Reject Qty	Reject Number	Insp. Stamp

[illegible]

0.00

0.00

0.00

Quality Control

Work Order ID 52217

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Item ID: D212-664-201

Revision ID: C

Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00

Required Date: 10/9/2009 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Accept



Setup Start



Stop



Cust Item ID:

Customer:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 	Pick Kit	0.00							
Packaging	Memo	0.00							
Packaging									
260 	QC4- 100% Inspect kits for completeness	0.00							
QC	Memo	0.00							
Quality Control									
270 	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-201								

Work Order ID 52217

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Item ID: D212-664-201

Accept

Revision ID: C

Item Name: Crosstube Aft

Start Date: 9/21/2009 Start Qty: 1.00

Required Date: 10/9/2009 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

W 9.12.07

Picklist Print

Monday, September 21, 2009 7:52:13 AM

Page 1

Work Order ID: 52217



Parent Item: D212-664-201RevC



Parent Item Name: Crosstube Aft

Start Date: 9/21/2009

Required Date: 10/9/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D212-664-
201TRNRevC

Manufactured No

110

Each

3.0000

1.0000



Crosstube Turning Detail

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

FG

3

46386

1

50991

1

51220

1

D3595-063-530RevA

Manufactured No

230

Each

208.0000

2.0000



RUBBER CUSHION

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

208

40780

2

44998

2

50030

100

51776

104

3-5274 MB 09-10-20
3-52139 MB 09-10-15

Picklist Print

Page 2

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Work Order ID: 52217



Parent Item: D212-664-201RevC



Parent Item Name: Crosstube Aft

Start Date: 9/21/2009

Required Date: 10/9/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty/To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D2940-1RevB

Manufactured

No

230

Each

44.0000

2.0000



Support

WarehouseLoc QtyLoc CodeLocation

Main Warehouse

ST

44

24367

4

25594

2

45203

18

47748

20

MS21920-28

Purchased

No

230

Each

136.0000

4.0000



Clamp(per MIL-DTL-8783C)

WarehouseLoc QtyLoc CodeLocation

OFFSHORE

FG

5

105884

5

Main Warehouse

ST

131

106864

5

108466

9

108847

7

109181

14

109965

2

111281

2

111734

42

112624

50

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Shop Packet Print

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Picklist Print

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Work Order ID: 52217



Parent Item: D212-664-201RevC



Parent Item Name: Crosstube Aft

Start Date: 9/21/2009

Required Date: 10/9/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D3428-1RevA		Manufactured	No			250	Each	31.0000	1.0000			
-------------	--	--------------	----	--	--	-----	------	---------	--------	--	--	--



Placard

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

ST096

31

50790

31

MS21042L6		Purchased	No			250	Each	721.0000	6.0000			
-----------	--	-----------	----	--	--	-----	------	----------	--------	--	--	--



Nut

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

ST

721

105077

22

110002

5

111548

94

111578

400

112492

200

Picklist Print

Page 4

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Work Order ID: 52217



Parent Item: D212-664-201RevC



Parent Item Name: Crosstube Aft

Start Date: 9/21/2009

Required Date: 10/9/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

AN960JD616

Purchased

No

250

Each

712.0000

18.0000



Washer

WarehouseLoc QtyLoc CodeLocation

Main Warehouse

ST

712

107242

3

107959

6

109371

8

110704

23

111193

10

111607

4

112314

658

AN6-40A

Purchased

No

250

Each

74.0000

4.0000



Bolt

WarehouseLoc QtyLoc CodeLocation

Main Warehouse

ST

74

112314

4

112612

20

112679

50

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Shop Packet Print

Page 4

Picklist Print

Page 5

Monday, September 21, 2009 7:52:13 AM

Work Order ID: 52217



Parent Item: D212-664-201RevC



Parent Item Name: Crosstube Aft

Start Date: 9/21/2009

Required Date: 10/9/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-41 A		Purchased	No			250	Each	53.0000	2.0000			



Bolt



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

53

111605

33

112489

20

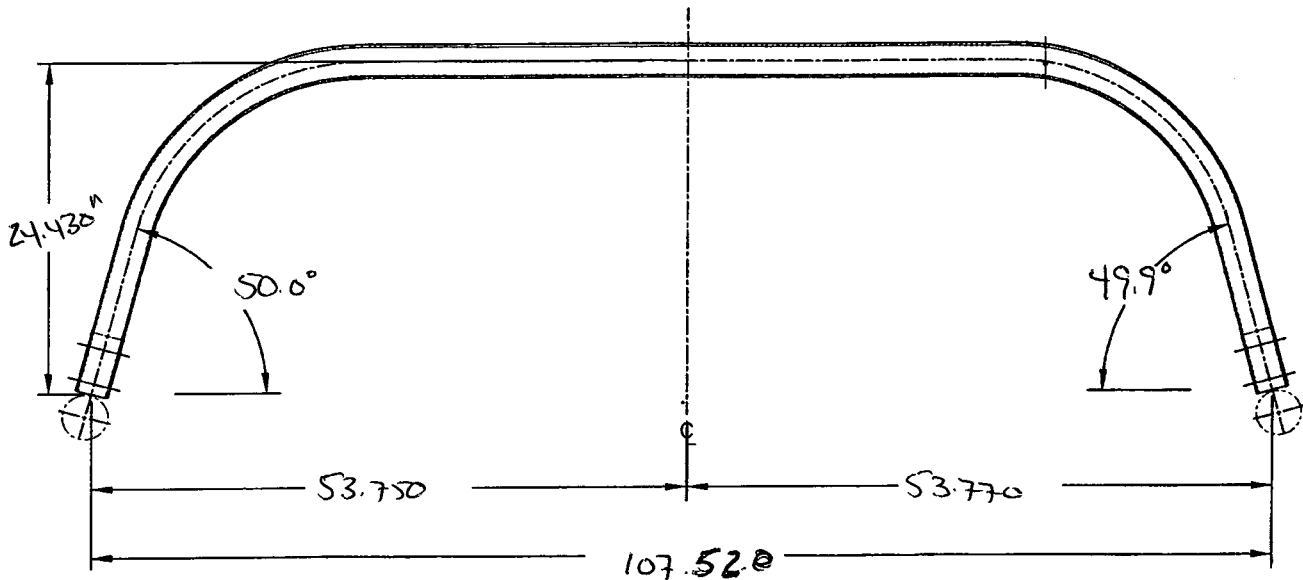
Monday, September 21, 2009 7:52:13 AM

Shop Packet Print

Page 5

DART AEROSPACE LTD		Work Order:	52217
Description: Crosstube High Aft (205/212)		Part Number:	D212-664-201
Inspection Dwg: D212-664-241 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	24.17	24.43
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	8
Date	09/10/20

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. C	KJ/JLM	

DART**RELEASED**
07.04.24
PER ECN 085**DEO ATTACHED**

DESIGN <i>PH</i>	DRAWN BY <i>PH</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>J</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D212-664-241	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE CROSSTUBE ASS'Y (205/212 HI AFT) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

Qty	Part Number	Description
X	D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
1	D6006-129	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
4	MS21920-28	CLAMP (OR MS21920-30)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

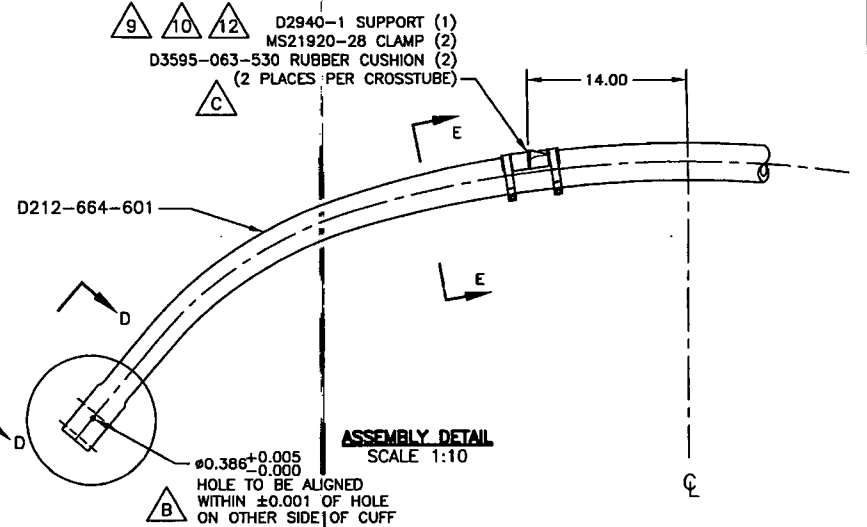
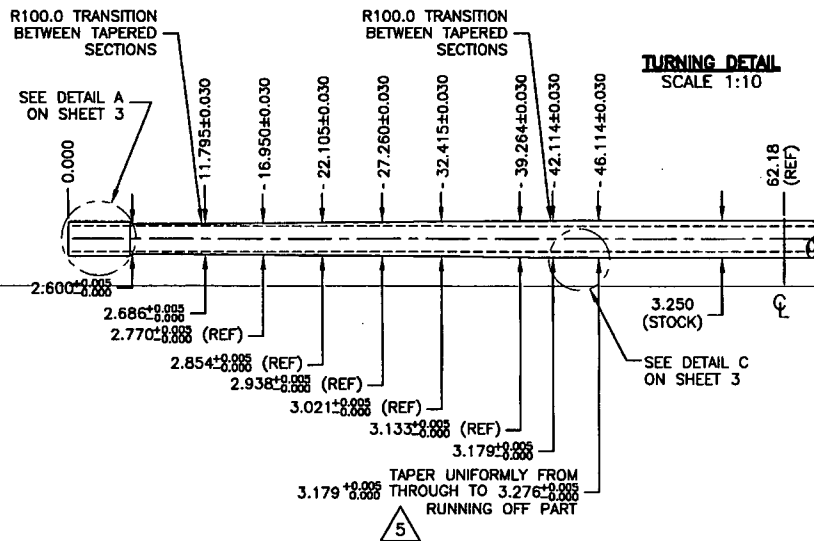
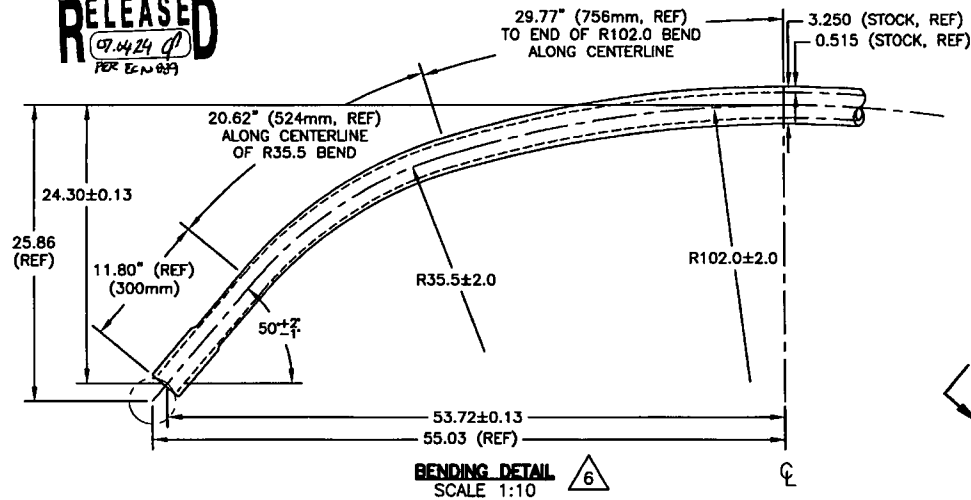
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.36±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE D2940-1 SUPPORT ON TOP SIDE OF CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
NOTE: MS21920-30 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 52217

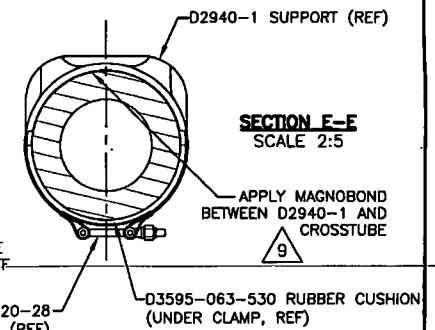
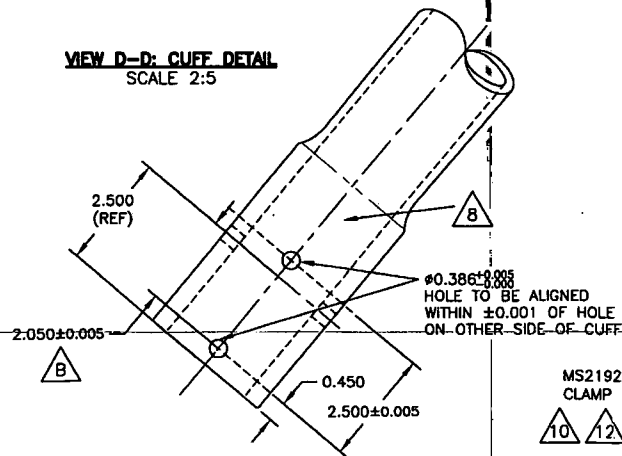
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RELEASED
07.04.24
PER E-10-039



VIEW D-D: CUFF DETAIL
SCALE 2:5



DEO ATTACHED

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DESIGN PH

CHECKED J

DATE 07.03.08

DRAWN BY PH

APPROVED J

DART

DART AEROSPACE LTD.
HARRISBURG, ONTARIO, CANADA

DRAWING NO.
D212-664-241

TITLE
CROSSTUBE ASS'Y (205/212 HI AFT)

REV. C

SHEET 2 OF 3

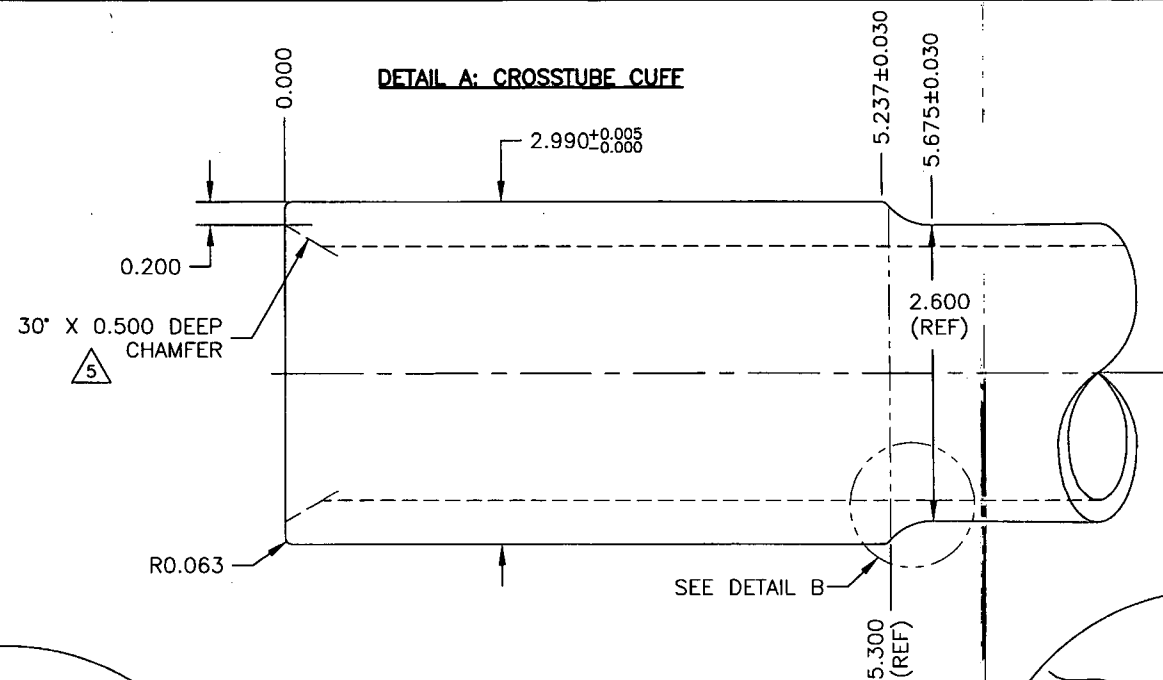
SCALE 1:10

W/O 52217

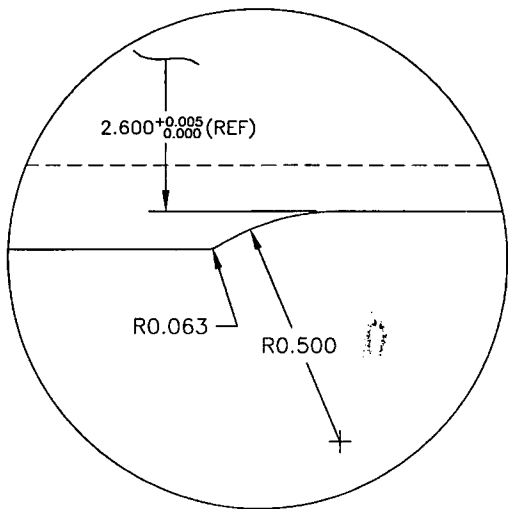
RELEASED
07.04.24
PER ECN 869

DEO ATTACHED

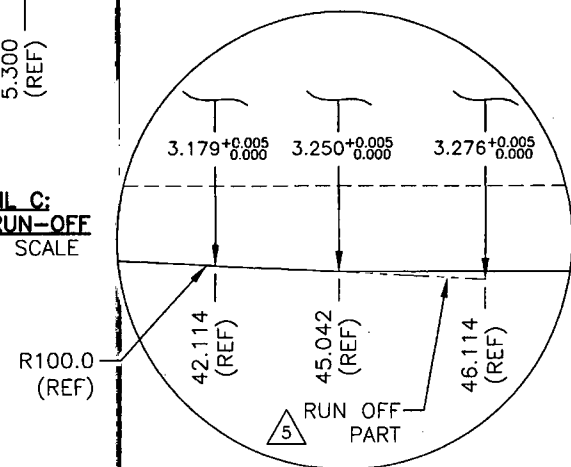
DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
TRANSITION
SCALE 4:1**



**DETAIL C:
TAPER RUN-OFF
NOT TO SCALE**



COPYRIGHT © 2000 BY DART AEROSPACE LTD.		DESIGN 1	DRAWN BY PH	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED PH	APPROVED PH	DRAWING NO. D212-664-241	REV. C SHEET 3 OF 3
DATE 07.03.08		TITLE CROSSTUBE ASS'Y (205/212 HI AFT)		SCALE 1:1	

11/0 5 2217

DRAWING NO. D212-664-241	TITLE CROSSTUBE	REV. C	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-241-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN UP	CHECKED RJ	MFG. APPR. E	APPROVED MD		DE APPR. H		
DATE 09.05.01	DATE 09.06.15	DATE 09.06.15	DATE 09/06/16		DATE 09/06/16		

CHANGE:

ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)

THE D212-664-241B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-241 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-241 CROSSTUBE.

RELEASED
09/06/22 JH

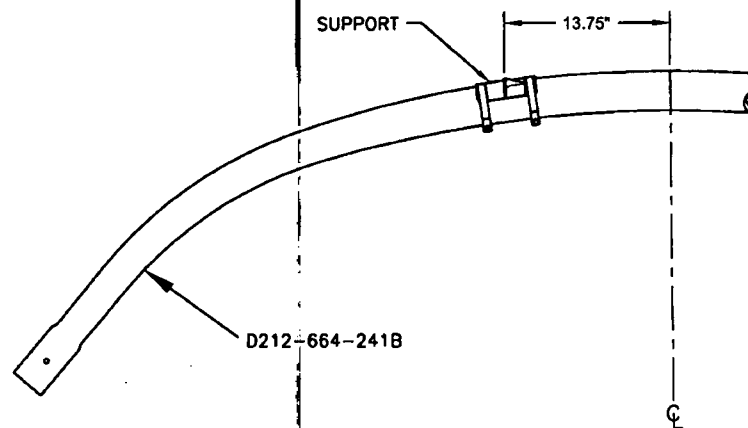


FIGURE 1 - SUPPORT INSTALLATION